

# CORNELL UNIVERSITY OFFICIAL PUBLICATION

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Volume XXV

Number 12

Announcement of the

## Summer School of Biology

### 1934

Ithaca, New York  
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## THE CALENDAR

### THE FIRST TEN DAYS

July 9, Monday, 8 A. M.-5 P. M.	Registration, <i>State Drill Hall</i> .
July 10, Tuesday.....	Instruction begins at the time and place announced for each course. Registration is continued at Registrar's office, <i>Morrill Hall</i> .
July 12, Thursday evening.....	Lecture-Recital.
July 13, Friday, until 4 P. M....	Last day for payment of fees at the Treasurer's office, <i>Morrill Hall</i> .
July 15, Sunday, 11 A. M.....	Public Worship and Sermon in <i>Sage Chapel</i> .
July 15, Sunday evening.....	Organ Recital, <i>Bailey Hall</i> .
July 16, Monday evening.....	Lecture Course.

### THE REGULAR WEEKLY SCHEDULE

Sunday, 11 A. M.	Public Worship and Sermon, <i>Sage Chapel</i> . (Beginning July 15.)
Sunday evening,	Organ Recital, <i>Bailey Hall</i> . (Beginning July 15.)
Monday evening,	Lecture Course. (Beginning July 16.)
Wednesday evening,	Departmental Lectures and Conferences. (Beginning July 11.)
Thursday evening,	Lecture-Recital. (Beginning July 12.)
Friday evening,	Plays by Summer Theater Company. (Beginning July 13.)
Saturday evening,	Plays by Summer Theater Company. (Beginning July 14.)

### THE LAST DAY

August 17, Friday .....	Summer Session ends.
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### THE WEEKLY CALENDAR

The WEEKLY CALENDAR of the University carries announcements of all public exercises held in connection with the Summer Session. It is posted on the bulletin boards.

## SUMMER SCHOOL OF BIOLOGY

Under the auspices of the New York State Summer Session at Cornell University and the Summer Session of Cornell University.

The tuition fee in the Summer School of Biology, regardless of the number of courses taken, is sixty dollars.

### STAFF OF INSTRUCTION

OTIS FREEMAN CURTIS, Ph.D.	Plant Physiology
(Professor of Botany)	
ARTHUR JOHNSON EAMES, Ph.D.	Plant Anatomy and Morphology
(Professor of Botany)	
HARRY MORTON FITZPATRICK, Ph.D.	Mycology
(Professor of Mycology)	
ALLAN CAMERON FRASER, Ph.D.	Genetics
(Assistant Professor of Plant Breeding)	
WILLIAM JOHN HAMILTON, JR., Ph.D.	Zoology
(Instructor in Zoology)	
RUSSELL P. HUNTER, Ph.D.	Zoology
(Assistant in Zoology)	
OSKAR AUGUSTUS JOHANSEN, Ph.D.	Entomology
(Professor of Entomology)	
BENJAMIN FREEMAN KINGSBURY, Ph.D., M.D.	Histology and Embryology
(Professor of Histology and Embryology)	
ROBERT MATHESON, Ph.D.	Entomology
(Professor of Entomology)	
AMY GRACE MEKEEL, Ph.D.	Zoology
(Assistant in Zoology)	
LOREN CLIFFORD PETRY, Ph.D.	Paleobotany and Elementary Botany
(Professor of Botany)	
HUGH DANIEL REED, Ph.D.	General Zoology and Morphology
(Professor of Zoology)	
THEODORE SNOOK, Ph.D.	Histology and Embryology
(Instructor in Histology and Embryology)	
WILLIAM HARDY THARP, Ph.D.	Botany
(Instructor in Botany)	
KARL MCKAY WIEGAND, Ph.D.	Plant Taxonomy
(Professor of Botany)	
BENJAMIN PERCY YOUNG, Ph.D.	Invertebrate Zoology
(Assistant Professor of Zoology)	

### GENERAL PLANS AND AIMS

The Summer School of Biology was organized to provide instruction of the highest grade in zoology, botany, and allied subjects. All the regular facilities of the University are at the disposal of the students, and as far as possible the staff has been restricted to teachers of professorial rank in the University. The courses are for the most part those given during the regular academic year condensed into a period of six weeks, but not abridged. The work is particularly planned to meet the needs of teachers and graduate students who wish to know, in addition to the subject matter, something of the methods and sources in teaching; but undergraduates also, if sufficiently prepared, will find the courses adapted to their needs. Intensive rather than extensive work is necessarily expected

of each student, as the courses are comprehensive. These courses lead toward advanced degrees, and special attention is given to graduate students pursuing research. Students interested in graduate study should, if possible, consult by letter with Professor K. M. Wiegand, representing the School of Biology, or with the professor concerned, before coming to Ithaca.

The intensive interest in Biology at Cornell University over a period of years has resulted in a wealth of laboratory material. Very extensive and in some cases unique collections of both plants and animals, and a very complete working library, are available to students prepared to use them. Ithaca is located in the Finger Lakes region of Central New York, noted not only for its picturesque beauty, but for its richness in biological material of both plants and animals. In this respect the University is perhaps not excelled by any other institution in the country. The collecting grounds are for the most part adjacent to the campus, and can be very readily visited. Within easy reach of the laboratories are fresh-water marshes and lakes, salt springs, marl springs, marl bogs, peat bogs, extensive ravines with numerous waterfalls, and upland woods or fields overlying either calcareous or noncalcareous sandy or heavy soils. The country shows a considerable variation in elevation, thus giving samples of several life zones. It is therefore possible to use as illustrative material those inland organisms which may be obtained most readily by teachers throughout the country for use in their classes.

## GENERAL INFORMATION

### CONDUCT AND SCHOLARSHIP

The Summer Session is conducted under the same general regulations concerning conduct and scholarship as apply during the academic year. For this reason students are requested to familiarize themselves with dormitory and other rules, and to abide by them. The officers of the University also reserve the right to cancel the registration of any student at any time for neglect of scholastic duties. The rules governing student conduct are:

"A student is expected to show both within and without the University unfailing respect for order, morality, personal honor, and the rights of others. The authority to administer this rule and to impose penalties for its violation is vested in the University Committee on Student Conduct. The rule is construed as applicable at all times, in all places, to all students of the University. A student may at any time be removed from the University if, in the opinion of the Committee on Student Conduct, his presence is not conducive to the University's best interests."

### ADMISSION

There are no examinations for admission to the Summer Session. Each person must, however, satisfy the instructor in charge of every course he intends to take, unless it be elementary, that he is qualified to pursue the work.

An undergraduate student who is registered in an institution other than Cornell and who wishes to enter the Summer Session must secure from his dean or other competent authority a certificate of good standing. Students on probation and students whose names have been removed from the rolls of the institution are regarded as not in good standing and accordingly are not admitted. A blank form of certificate may be had on application to the Secretary of the Summer Session.

Undergraduate students who are on probation or whose names have been removed from the rolls of any college at Cornell University are not admitted to the Summer Session except upon the recommendation of the college concerned.

Admission to the classrooms during the Summer Session is restricted to students duly registered for the session. A student thus duly registered may occasionally visit any class; but if he wishes to attend regularly without credit he must secure special permission from the Chairman of the Summer Session. Such permission will be granted only when the student can show a serious purpose in such attendance.

### REGISTRATION

All students of the Summer Session are required to register with the Registrar of the University. For the session of 1934 the registra-

tion day is Monday, July 9, the hours 8 a. m. to 5 p. m., the place the State Drill Hall. Students are urged to register on the official opening day. If they reach Ithaca on July 10 or later, they must register at the office of the Registrar in Morrill Hall between 9 a. m. and 4 p. m. Registration before July 9 is not required, and it is useless to apply for registration blanks in advance.

Beginning on Tuesday, July 10, the Registrar's office in Morrill Hall will be open from 9 A. M. till 4 P. M. every week day except Saturday, when it will be closed at noon.

Students who wish to obtain credit for graduate work done during the Summer Session must register not only with the Registrar but also with the Dean of the Graduate School, at the Drill Hall on registration day or thereafter at the Dean's office, 22 Morrill Hall.

Persons who are to take courses in the New York State Summer Session or in any department of the Summer Session of the University in addition to those taken in the Summer School of Biology must register also in the School or Schools in which courses are taken. They are required to pay only one tuition fee.

## TUITION AND FEES

The charge for tuition is sixty dollars. The tuition fee is payable in full, on the first registration day or within the next five days, at the office of the Treasurer, Morrill Hall.

Any student who fails to pay his tuition charges, other fees, and other indebtedness to the University, or who, if entitled to free tuition, fails to claim it at the Treasurer's office and pay his fees and other indebtedness, within the prescribed period of grace, is thereby dropped from the University unless the Treasurer has granted him an extension of time to complete payment. The Treasurer is permitted to grant such an extension, when in his judgment, the circumstances of a particular case warrant his doing so. For any such extension the student is assessed a fee of \$5 for the first week and \$2 additional for each subsequent week in which the whole or any part of the debt remains unpaid, but the assessment in any case is not more than \$15. The assessment may be waived in any instance for reasons satisfactory to the Comptroller and the Registrar, when such reasons are set forth in a written statement.

If a student withdraws from the Summer Session, the Treasurer may refund a part of the tuition fee or cancel a part of the obligation that the student has incurred for tuition, provided the reason for the withdrawal be stated in writing and be satisfactory to the Comptroller and the Registrar. In such a case the student is required to pay twenty-five per cent of the term's tuition for each week or fraction of a week between the first registration day and the date of his certificate of withdrawal.

Students registering at any time during the last four weeks of the Summer are required to pay for the remainder of the term at the rate of twenty-five per cent of the term's tuition for each week or fraction of a week between the date of registration and the last examination day of the term.

Any tuition fee or other fee may be changed by the Trustees to take effect at any time without previous notice.

*Laboratory Fees.* A laboratory fee is charged for each course, the fee varying with the character of the course. The amount which the student must expect to pay upon beginning any course is stated in the description of that course.

*Library.* A person who obtains the privilege of taking books from the University Library for home use is required to make a deposit of five dollars, which will be refunded upon the return of all books taken out.

*Willard Straight Hall.* A fee of three dollars is charged for the privileges of Willard Straight Hall. See page 13.

*Automobile Permits.* Any student wishing to operate an automobile during the Summer Session must at the time of registration for courses officially register his car with the Committee on Traffic Control. For this purpose an officer of the University will be present in the registration room. The fee is one dollar. A student who wishes to park his car on the Campus must also secure a parking permit, paying therefor an additional fee of one dollar.

## CERTIFICATES FOR WORK DONE

Students of the Summer Session who are not matriculated in the University may receive certificates of attendance and of work satisfactorily performed. Application for them must be made before August 10, and the applicant must leave at the office of the Registrar a large-sized envelope stamped and directed to his home address. The certificate will then be forwarded by mail. The regulations of each department for the granting of a certificate must be met.

## UNDERGRADUATE ACADEMIC CREDIT

On the completion of any course offered in the Summer School of Biology the student may receive credit toward a degree for the number of hours indicated under each course. Requirements for the baccalaureate degree in each college at Cornell may be learned on application. Further regulations concerning credit may be learned on application, or by consulting the regular Announcement of the Summer Session.

## GRADUATE WORK IN THE SUMMER

Most of the work offered in the Summer School of Biology leads directly toward advanced degrees.

### ADMISSION

A student who wishes to enter the Graduate School must file application for admission in the Office of the Dean of the Graduate School by June 25. Application must be made on the formal blanks obtainable from the office of the Graduate School, and must be accompanied by complete and official transcripts of the student's previous training.

A graduate of any college whose requirements for a first degree are substantially equivalent to those for the first degree at Cornell may be admitted to resident study in the Graduate School. He may

then enter at once upon candidacy for an advanced degree if he is able to show that he has had adequate preliminary training in the subjects which he proposes to pursue and obtains the consent of a special committee (see below) to supervise his studies. Work leading toward the degrees of A.M., M.S., and Ph.D. is offered.

Students wishing to become candidates for an advanced degree and to study in the Summer School of Biology are advised to write to the professors whose work they expect to take or confer with them personally before the opening of the School. They should also write to the Dean of the Graduate School, asking for a blank form of application for admission to the Graduate School. Delay may be avoided by making these arrangements before coming to Ithaca. In this way, moreover, it may be possible to secure the advice and guidance of professors in fields of study of which no specific mention is made in the announcements.

### REGISTRATION

All graduate students in the Summer Session are required to register both with the Registrar and with the Dean of the Graduate School. The latest date for such registration in 1934 is July 12. Residence credit cannot be given unless registration and formal candidacy for a degree under a special committee are arranged before the above date. No period of less than six weeks can be counted toward residence for a degree. Students working under personal direction are required to register with the Registrar as well as in the Graduate School.

### TUITION AND FEES

Students of the Summer School of Biology who for the first time have been admitted to candidacy for a Master's degree are required to pay the regular tuition fee of \$60. They must also pay a matriculation fee of \$10 (if they have not previously matriculated in Cornell University), and an administration fee of \$6.25. If they have paid tuition in the Graduate School during a term of the academic year or in a previous summer session, they must pay a tuition charge of \$30 for the summer session and an administration charge of \$6.25. No student shall receive the Master's degree who has not paid tuition equivalent to that of one academic year.

Candidates for the Degree of Doctor of Philosophy working under personal direction are required to pay an administration fee of \$6.25. Such students desiring residence credit for their work, must pay tuition for the credit desired pro rata at the rate charged for the regular academic year, such payment to admit them to the current summer session classes without additional tuition payments; provided that the amount of tuition paid is at least equal to that charged students registered in the Summer Session. Students registered under personal direction during the summer, not for credit, are exempt from the payment of tuition, but may not attend either as visitors or for subsequent credit, any of the classes or exercises of the summer session.



A Graduation Fee of \$20 is required, at least ten days before the degree is to be conferred, of every candidate for an advanced degree. The fee will be returned if the degree is not conferred.

For laboratory and other fees, see page 6.

Any tuition fee or other fee may be changed by the Trustees to take effect at any time without previous notice.

### THE MASTER'S DEGREE

The candidate wishing to matriculate for the Master's degree must select an acceptable major subject and one related minor subject and obtain the signatures of the professors representing those fields of study. The professors with whom he thus works constitute his special committee. While the candidate is expected to assume the initiative and responsibility for his studies, he is expected to follow the general advice of this committee, who will examine him on the completion of his work, and recommend him for the degree.

Many courses offered in the Summer School lead toward this degree. The student with the aid and approval of his graduate committee plans a program of study leading toward his degree. After a minimum residence of four summer sessions, the completion of his program in a scholarly manner, and the completion of a thesis, he will appear before his committee for a final oral, or oral and written, examination on the field covered by his program and on his thesis. On the satisfactory completion of his program and thesis he will be recommended for the Master's degree to the Faculty of the Graduate School.

It should be noted that in general not courses and hours but final scholarship and achievement determine the eligibility of a student for the degree. Graduate work to be considered acceptable for a degree must be of an advanced character.

Although four summer sessions are said above to be acceptable as a minimum requirement of residence, this time is really less than is required during the academic year, as four summer sessions make a total of twenty-four weeks whereas the regular year is about thirty weeks in length. For this reason the student may be expected to complete some work at Ithaca or in absentia, under the direction of his committee, either during the academic year or in a later summer session. Occasionally a fifth summer session is necessary in order to complete the thesis, or to take courses which, owing to conflict or other causes, could not be taken previously.

No residence credit toward a master's degree will be granted any student who does not register with the Dean of the Graduate School within three days after the opening of the session and who does not formally become a candidate for the degree under the direction of a special committee.

### THE DOCTOR'S DEGREE

Candidates will find it necessary to pursue the greater part of the work for this degree during the regular academic year. During the

Summer Session, however, many courses are given which are necessary as background or preparation for further work, and on recommendation of the student's special committee he will receive residence credit for attendance at the summer session. It is frequently possible to arrange for the supervision of research during the summer, either over the period of six weeks or preferably over a longer period.

## RESIDENTIAL HALLS: ROOMS: BOARD

### FOR WOMEN

The University has two groups of residential halls for women in which board and room can be obtained during the Summer Session by registered students only. They are:

*Sage College*, which accommodates 175 persons. Here the charge for room and a specified amount of laundry, for the session, is from \$24 to \$39, according to the size and location of the room. The dining room will not be open. Board may be obtained at Willard Straight Hall, across the green from Sage, or at the cafeteria in the Home Economics Building.

*Prudence Risley Hall*, which accommodates 184 persons. Here the charge for room, board, and a specified amount of laundry, for the session, is from \$78 to \$87, according to the size and location of the room.

Besides these halls there are, off the campus, certain *approved houses*, which are privately owned and occupied, which are under the general supervision of the Dean of Women, and in which women students exclusively are accommodated.

Undergraduate women students of Cornell and other colleges and other women students under twenty-one years of age are expected to live in the residential halls or the approved houses. Any woman student should consult the Dean of Women before engaging a room.

In the residential halls for women the charge for room and board includes dinner and lodging Saturday night, July 7 (not earlier), and all meals to and including breakfast Saturday, August 18.

Members of the Summer Session who lodge outside Prudence Risley Hall may obtain table board at that hall for \$9 a week (or \$48 for the six weeks of the session).

Each of the residential halls is in charge of a warden, who is glad to know the students, to advise them in illness or other emergency, and to give them whatever information they wish about the University or the town. It is understood that persons living in the halls will conform to the house regulations made for the convenience and comfort of all.

*Application for rooms in any of the residential halls or approved houses for women should be made to the Manager of Residential Halls, Morrill Hall, Ithaca, N. Y.* Information about such rooms may be obtained from the Manager in advance of the application. The list of approved houses will be available after June 1 on application to the Manager, and also, if desired, a supplementary list of private

houses with desirable rooms available for mature women who prefer to live outside any of the halls or approved houses. Checks should be drawn to the order of Cornell University.

A *deposit of five dollars* must accompany each application for a room in any of the residential halls; otherwise the application will not be entertained. The rooms are reserved in the order of application. If a room assigned is occupied by the applicant, the amount of deposit is held until the end of the session to cover the return of keys and any damage to building or furniture other than ordinary wear and tear, and to insure the completion of the lease. The deposit will be refunded if the applicant gives formal notice to the Manager on or before June 15 that she wishes to withdraw her application.

### FOR MEN

Men regularly enrolled in the Summer Session can obtain comfortable rooms in the Residential Halls for Men, which are thoroughly modern and of fireproof construction.

In the *Residential Halls* the charge for furnished room, including care of the room and laundry of bed linen, is \$18 for the session. There are a few suites at a higher rate, and some rooms on the top floor may be had for less.

Board can be obtained for an average of \$1 to \$1.50 a day in Willard Straight Hall or in other dining rooms or restaurants on or near the campus.

*Applications for rooms in the Residential Halls for Men, or for plans of the rooms or other information about them, should be made to the Manager of Residential Halls, Morrill Hall, Ithaca, N. Y.* Checks should be drawn to the order of Cornell University.

A list of private houses offering desirable rooms for rent for the session can be obtained after June 1 by application to the Manager of Residential Halls, Morrill Hall, Ithaca, N. Y.

### THE COST OF LIVING

An estimate of the cost of living in Ithaca in the summer can be made by consulting the figures given above. In a private house rentals vary according to the location. Rooms are rented with the understanding that they will be occupied for the entire session unless both parties agree otherwise. Table board is generally engaged by the week.

### MEANS OF SELF-SUPPORT

Students, either men or women, who wish to earn part of their expenses during the session are invited to correspond in advance with the Manager of Residential Halls, Morrill Hall, Ithaca.

### THE CASHING OF CHECKS

The Treasurer of the University accepts checks in settlement of charges payable at his office, but a rule of the Board of Trustees forbids him to cash any credit instrument, even to the extent of accept-

ing a check or draft in amount greater than the sum due and returning the excess in cash. Students are therefore advised to open an account in an Ithaca Bank as soon as they arrive in town, or else provide themselves with travelers' checks, drafts on New York City banks, money orders, or other form of credit instrument such as a bank will cash in the ordinary course of business.

## THE STUDENT'S HEALTH

### MEDICAL ADVICE

The University's staff includes medical advisers of men and of women, with a corps of assistants. The medical advisers observe regular office hours, from 9 A. M. till 1 P. M. daily, at the medical offices in the Old Armory. A trained nurse is on duty from 2 P. M. till 4 P. M. daily. No charge is made for these services.

In cases of illness or indisposition which involve absence from classes even for one day, students are expected to report immediately either in person, by telephone, or by messenger to the medical adviser's office. For the convenience of the adviser such illness should be reported early in the day. Students indisposed but still able to attend classes should consult the medical adviser immediately in order that advice may be given and that diagnosis of incipient diseases may be made promptly. Any student failing to report as soon as possible to the medical adviser any contagious or infectious disease will be regarded as guilty of a serious breach of discipline.

A medical examination is not required of students in the Summer Session.

A student may at any time be requested to withdraw from the University if, in the opinion of the University authorities, the condition of his health is such as to make it unwise for him to remain.

Every student matriculating in Cornell University must present a certificate showing that he has been vaccinated within five years. Students in the Summer Session are not matriculated students and of them accordingly such vaccination certificate is not required. If, however, students attending the Summer Session should matriculate in any of the colleges of the University or in the Graduate School, they must give evidence of recent vaccination like others so matriculated.

### THE UNIVERSITY INFIRMARY

The University Infirmary occupies three large buildings near the campus. The first of these, a brownstone structure, was the residence of Henry Williams Sage, for many years Chairman of the Board of Trustees of the University. The second building, the Schuyler House, was purchased in 1911; in 1912 the Trustees erected a third building, fireproof, and this is the present main hospital building. The normal capacity of the Infirmary is seventy-five beds; the number can be doubled in an emergency.

The Infirmary, which is in charge of an experienced superintendent and is thoroughly equipped, provides suitable rooms, food, and nurs-

ing for sick students. It has no medical staff; students find their own physicians among practitioners in Ithaca or elsewhere.

Students in the Summer Session have all the privileges of admission to the Infirmary. They pay no fee in advance, but are liable to regular charges for services rendered.

## THE LIBRARIES

The University Library is open on week days from 8 A. M. till 10:30 P. M. In this building are the main library, containing about 500,000 volumes, and most of the seminary and special libraries. The main reading room affords accommodations for more than two hundred readers, and contains a selected library of about 8,000 volumes of reference works. Below stairs is the periodical room in which are kept the current numbers of about 500 journals in various fields of knowledge. These rooms are open to all students. Students properly qualified are allowed the use of the seminary rooms and the books in them. The main collection is primarily a library of reference for use in the building. Students are, however, to a limited extent, allowed to take out books for home use. Persons wishing this privilege must make a deposit of \$5, which will be refunded upon the return of all books taken out.

The Library of the College of Agriculture, in the basement of Stone Hall, is open on week days from 9 A. M. till 5 P. M., except Saturday, when it is closed at 1 P. M. In it will be found a large collection of bulletins and reports of experiment stations, reference books on agriculture and country life, agricultural periodicals, and the like. The entomological library, housed in the Entomology Building, is one of the most complete of its kind in the United States. Nearly all of the departments in which instruction is given have well-selected departmental libraries.

## WILLARD STRAIGHT HALL

All privileges of Willard Straight Hall, the social center of the University, are open to Summer Session students, both men and women, as during the regular college year. In accordance with regular procedure, a fee of \$3 is required of all summer registrants, payable at the time of the regular tuition fee.

## SAGE CHAPEL

Religious services are conducted in Sage Chapel throughout the academic year by clergymen of various religious denominations. There will be services in the Chapel on five Sundays during the Summer Session, July 15 to August 12 inclusive.

## LECTURES: MUSICAL RECITALS: EXCURSIONS

In addition to the regular classroom work there will be general public lectures on Monday evenings, and also lectures of general

interest each week in connection with the work of various departments. They will be all announced in the Weekly Calendar.

Organ recitals will be given each Sunday evening in Bailey Hall by Assistant Professor Harold D. Smith, the University Organist. A series of lecture recitals will be given on Thursday evenings in the Memorial Hall of Willard Straight Hall, by members of the staff of the Department of Music. These recitals are free to all students.

Wednesday evenings are devoted to the departmental conferences, which are open to all interested persons. Notice of these conferences will be given from week to week.

Excursions, in connection with the work of certain departments, are made to many points of interest. Some of them are open to all members of the Summer Session. Especially noteworthy are the excursions to Watkins Glen and to Niagara Falls.

## RAILROAD ROUTES TO ITHACA

Ithaca can be reached from New York City by either the Delaware, Lackawanna & Western or the Lehigh Valley Railroad. On both roads there are good trains, with Pullman cars, both night and day. Passengers from the west reach Ithaca by way of the Lehigh Valley Railroad from Buffalo. From stations on the Boston & Albany Railroad, the shortest route to Ithaca is by way of Syracuse and Auburn. From Philadelphia, and from Baltimore, Washington, and the south by way of the Baltimore & Ohio, the Philadelphia & Reading connects with the Lehigh Valley at Bethlehem. From stations on the Erie, connections with Ithaca can be made either by the Lackawanna at Owego or by the Lehigh Valley (Elmira and Cortland branch) at Elmira. Ithaca has connections with the New York Central at Geneva, Auburn, and Canastota.

## REDUCED RATES BY RAIL

Students coming from points in the territory of the Central Passenger Association and of the Trunk Line Association are assured of a special round-trip rate of a fare and a third. Tickets will be on sale from July 5 to 10 inclusive, and the return limit will be August 21. The specified territories extend west to Chicago, St. Louis, and Cincinnati, and south to Washington; but do not include New England. Similar rates from other sections may also be available. Students should make inquiries at their local railroad offices.

**Students wishing to avail themselves of reduced rates must secure in advance an identification certificate, which may be had by application to The Summer Session, Goldwin Smith Hall, Ithaca, N. Y.**

## COURSES OF INSTRUCTION

The word *hour* when used with reference to University credit means the equivalent of one lecture or recitation or two and one-half to three hours of laboratory work a week for a half-year or one semester. In order that this amount of credit may be obtained in six weeks the work done per week must be fully two and one-half times as great. One hundred and twenty such hours are required of candidates for the A.B. degree.

(A limited amount of change in the hours scheduled may be made by the staff at the beginning of the session to avoid conflicts. In the case of morning laboratories the student may obtain permission, at the option of the instructor, to be absent for a period to attend a lecture in some other course. The time so lost is to be made up later.)

### COURSES DEALING PRIMARILY WITH PLANTS

**S 1a. General Botany—Anatomy and Physiology.** Credit three hours. Equivalent to Botany 1, first term. Lectures, M T W Th F, 10. Laboratory and conferences, M T W Th F, 11-1. *Plant Science* 141, 262. Professor PETRY.

The structures and life processes of the higher plants are examined in detail, with considerable attention to information necessary for more advanced or practical work with plants. Students taking this course may attend the field trips offered in connection with Botany S 1b. Laboratory fee, \$3.50.

**S 1b. General Botany—Morphology and Taxonomy.** Credit three hours. Equivalent to Botany 1, second term. May be taken in conjunction with Botany S 1a, or independently. Lectures, M T W Th F, 2. Laboratory, M T W Th F, 3-4:30. Three half day field trips, on Saturdays to be arranged. *Plant Science* 141, 242. Professor PETRY and Dr. THARP.

Representatives of the principal groups of plants are studied with a view to acquainting the student with the plant kingdom as a whole. The principal families of ferns and flowering plants are examined and practice in identification is given.

The field work is intended to afford to teachers and others first-hand knowledge of the commoner plants of all the great groups. Facilities for collecting plant materials for teaching or other purposes will be provided. Laboratory fee, \$3.50.

**S 2. Plant Physiology.** Credit four hours. Equivalent to Botany 31. Prerequisite course S 1 or its equivalent, elementary chemistry, and permission to register. Lectures, M T W Th F, 12. *Plant Science* 141. Laboratory, T W Th F, 9-12. *Plant Science* 227. Professor O. F. CURTIS.

This course is designed to acquaint the student with the important life processes of plants. Topics such as water-relations, photosynthesis, translocation, digestion, respiration, mineral nutrition, and growth relations are studied in some detail and particular emphasis is placed both in laboratory and in classroom on discussion of the principles and their applications to growing plants. Laboratory fee, \$4; deposit, \$3.

**S 3. Taxonomy of Vascular Plants.** Credit four hours. Equivalent to Botany 117. Prerequisite course S 1 or its equivalent. Lectures, M T W Th, 2. Laboratory, M T W Th, 3-6, F, 2-5. Several all-day field trips will be arranged. *Plant Science* 211. Professor WIEGAND.

A study of the kinds of seed plants and ferns; their classification into genera, families, and orders; and field work on the local flora. Emphasis will be placed on wild plants, but the more common cultivated plants will have some attention. The course is planned to follow course S 1 and to furnish an introduction to the knowledge of field botany and to the classification of the higher plants, in preparation for special work in various departments and as an aid in teaching. Instruction will be given in herbarium methods. Laboratory fee, \$4; deposit, \$5.

[**Trees and Shrubs**—A course in the Taxonomy and Ecology of woody plants Assistant Professor MUENSCHER. Given in the Summer School of Agriculture.]

[**General Plant Pathology**—Given in the Summer School of Agriculture. Open to students in the Summer School of Biology.]

S 4. **Comparative Morphology of Fungi.** Credit four hours. Equivalent to Plant Pathology 121. Prerequisite course S 1 or its equivalent and permission to register. Lectures, M W F, 9. *Plant Science* 333. Laboratory, fifteen actual hours a week, by arrangement. *Plant Science* 333. Professor FITZPATRICK.

An elementary synoptical course designed to acquaint the student with the general field of mycology. Emphasis is placed on morphology and phylogeny, rather than on taxonomy, but abundant opportunity is given for field work. Laboratory fee, \$6; deposit, \$3.

S 7. **Mycology.** Credit four hours. Prerequisite courses S 1 and S 4 or their equivalent and permission to register. Lectures or conferences, T Th, by arrangement. Laboratory, fifteen actual hours a week, by arrangement. *Plant Science* 333. Professor FITZPATRICK.

An advanced course designed for students who wish to specialize in mycology or plant pathology. An intensive study of the morphology, taxonomy, cytology, and phylogeny of the fungi. Emphasis is placed on field work, with extensive practice in determination of material.

The groups of the fungi are studied in successive summers in the following order, (1) Phycomycetes, (2) Ascomycetes, (3) Basidiomycetes, (4) Uredinales, Ustilaginales, Fungi Imperfecti, and Myxomycetes. By repeating the course, the student may obtain in four summers the equivalent of Plant Pathology 221 and Plant Pathology 222. He may begin with any one of the four groups and need not take them in unbroken sequence. In the 1934 Summer Session, group (3) Basidiomycetes will be given. Laboratory fee, \$6; deposit, \$3.

S 5. **Plant Anatomy.** Credit four hours. Prerequisite course S 1 or an equivalent and permission to register. Laboratory, M T Th F, 8-11:30. Hours for lectures to be arranged within these periods. *Plant Science* 228. Professor EAMES.

A course in the descriptive anatomy of vascular plants with emphasis on practice in interpretation and determination of material. Laboratory fee, \$5.

[S 8. **Morphology of Vascular Plants.** Not given in 1934.]

S 19. **Special Problems with Plants.** Credit two or more hours. Hours to be arranged. In registering for this course the name of the professor with whom the work is to be taken must be stated.

Students sufficiently prepared may arrange for the study of some problem or special topic. Such work may lie in the fields of general or taxonomic botany, anatomy, comparative morphology, mycology, cytology, plant physiology, paleobotany, plant pathology, or genetics. A member of the staff must supervise the work.

## COURSES DEALING PRIMARILY WITH ANIMALS

S 20a. **Introductory Zoology.** Credit three hours. Lectures, M T W Th F, 9. *McGraw* 5. Laboratory, M T W Th, 11-1 or 2-4. Professor REED and Dr. MEKEEL.

The scope, objective, and principles of Animal Biology based upon a study of the structural and physiological organization of an animal type viewed from the standpoint of the organism as a biological unit. Also an introduction to the basic phenomena of reproduction, development, heredity, and evolution. Laboratory fee, \$2.50.

This course is the equivalent of the first term of Animal Biology I given during the academic year.

S 20b. **Intermediate Zoology.** Credit three hours. Lectures, M T W Th F, 10. *McGraw* 5. Laboratory, M T W Th 11-1 or 2-4. Professor REED and assistant. More advanced than S 20a. A study of the groups of animals stressing the pathway of descent and the critical epochs thereof, kinships, classification, adaptations, behavior, and the zoology of the human species. Laboratory fee,



\$2.50. Courses S 20a and S 20b may be taken simultaneously for six hours' credit.

This is the equivalent of the second term of Animal Biology I given during the academic year.

**S 21. Systematic Vertebrate Zoology and Ecology.** Credit four hours. Lectures, M T W Th, 1:40-2:30. Laboratory and field work, M T W Th, 2:30-5:30. *McGraw*. Several all-day trips are required. Occasionally a field trip, 5:30-8 A.M. or 5-8 P.M., may be substituted for the regular periods. Dr. HAMILTON.

Lectures on fishes, amphibians, reptiles, birds, and mammals; their habits, life-histories, coloration, respiration, locomotion, reproduction, and adaptations; together with their classification, nomenclature, characters, and relationships. Laboratory study of the parts employed in the classification of these groups, with training in the identification of two hundred and forty North American species. Field work is partly to give practice in field observations and in ready identification of local vertebrates in their natural environment, and partly to introduce some ecological methods. Textbook: Jordan's *Manual of Vertebrates of the North-eastern United States*, new edition. Laboratory fee, \$4.

**S 22. Invertebrate Zoology.** Credit four hours. Prerequisite Zoology S 20 or an equivalent and permission to register. Daily except Sat., 9-12:30. *McGraw*. Lectures, field trips, laboratory work, and discussions will be arranged during these periods. Assistant Professor YOUNG.

This course should provide a better foundation for the advanced students in the field of zoology or give to the teacher a knowledge of a larger variety of forms available for use in general courses either in high schools or in colleges. It differs from the type of invertebrate course offered by marine biological laboratories in that stress is laid upon many species which may be secured in the living state away from the shore. Methods used in collecting and the study of habitats are the more important objectives of the field trips. Classification, structure, and life cycles are emphasized in the laboratory. Laboratory fee, \$3.

**S 23. Vertebrate Zoology and Comparative Anatomy.** Credit four hours. Lectures, daily except Sat., 8. *McGraw* 5. Laboratory, fifteen hours a week at times to be arranged. Professor REED and Dr. HUNTER.

A thorough dissection and study of the several systems of organs in a selected series of vertebrate types. The various systems are considered with reference to their significance in progressive modifications and their bearing upon vertebrate descent. The lectures deal with the problems of comparative anatomy. Laboratory fee, \$6.

**S 26. Histology.** The tissues and their histogenesis. Credit four hours. No prerequisite, but previous work in biology, zoology, and botany or physiology is recommended. Lectures, M T W Th F, 12. The laboratory will be open every morning except Saturday. *Stimson*. Professor KINGSBURY and Dr. SNOOK.

For students of biology or those preparing for medicine. The cell and cellular origin of the body; the structure and development of its component tissues. Each student will prepare or receive a series of typical microscopic preparations.

The courses in histology and embryology are given in the histological laboratories in *Stimson Hall*. The department is well equipped for instruction in both subjects, having a large and adequate supply of modern microscopical instruments and an extensive collection of demonstration material for both histology and embryology. Microscopes are furnished by the department. Consultation with the instructors previous to registration is advised. Laboratory fee, \$6.

**S 27. Embryology of Vertebrates.** Credit four hours. Prerequisite a course in the histology of the tissues or a satisfactory equivalent in other biological work involving training in the use of the microscope. Lectures, M T W Th F, 9. The laboratory will be open every morning except Saturday. Professor KINGSBURY and Dr. SNOOK.

For students of biology or those preparing for medicine. Preparation and study of embryological specimens from all the chief groups of vertebrates. Particular emphasis is placed on the embryology of the chick. The student also acquires a knowledge of special methods useful in embryological work. Laboratory fee, \$6.

**S 30. General Entomology.** Credit three hours. Equivalent to Animal Biology 3 or Entomology 12. Prerequisite Biology 1 or Zoology 1 or its equivalent. Lectures, M T W Th F, 10. *Entomology Building* 200. Practical exercises, M W F, 1:40-4. *Entomology Building* 200. Professor MATHESON.

This course includes lectures and demonstrations on the characteristics of the orders and families of insects, with a study of their habits, life-histories, and relations to other animals and to plants. The laboratory work consists of the study of the structure, ecology, metamorphosis, and classification of insects. Field trips to study insects in their natural habitats are an important feature. Each student is required to collect and prepare a typical collection of insects. Opportunities are given for the rearing of insects in the Insectary, and special work is offered to suit the needs of individual students. Textbook: Comstock's *Manual for the Study of Insects* (1930 edition). Equipment: a good hand lens, several insect cases, insect pins, and labels. These can all be purchased in Ithaca. Laboratory fee, \$2.50.

**S 31. Elementary Morphology of Insects.** Credit three hours. Equivalent to Entomology 21. Twenty actual hours a week, by appointment. *Entomology Building* 270. Professor JOHANNSEN.

This course deals with the external and internal anatomy of several representative insects as the locust, roach, cicada, honeybee, crane-fly, etc. Laboratory fee, \$2.

**S 32. Elementary Systematic Entomology.** Credit two hours. Equivalent to Entomology 15 and 31a. Prerequisite course S 31. Fifteen actual hours a week, by appointment. *Entomology Building* 270. Professor JOHANNSEN.

The principles of wing venation and the classification of the orders and families. Laboratory fee, \$2.

Courses S 31 and S 32 are required of all students who plan to take advanced work in Entomology.

**S 34. Advanced Morphology, Histology, and Embryology of Insects.** Credit one hour. Prerequisite courses S 31 and S 30 or S 32 or equivalent. M W F, 8. Lectures, additional reading, and reports. *Entomology Building* 145. Professor JOHANNSEN.

This course will be given if four or more students register for it. In the summer of 1934 it will deal with embryology of insects.

**S 35. Histology of Insects.** Credit two hours. Must be preceded or accompanied by course S 31. Laboratory, fifteen actual hours a week, by appointment. *Entomology Building* 270. Professor JOHANNSEN.

Technique in histological methods as applied to insects. Laboratory fee, \$3.

**S 39. Special Problems with Animals.** Credit two hours or more. Hours to be arranged. In registering for this course the name of the professor with whom the work is to be taken must be stated.

Students sufficiently prepared may arrange for the study of some problem or special topic. Such work may lie in the fields of general zoology, invertebrate zoology, systematic vertebrate zoology, comparative anatomy of vertebrates, ornithology, histology, embryology, general entomology, systematic entomology, economic entomology, or general biology. A member of the staff must supervise the work.

## GENERAL COURSES DEALING WITH BOTH PLANTS AND ANIMALS

**S 40. Genetics.** Credit four hours. Prerequisite elementary botany and plant physiology, or elementary zoology and animal physiology, and permission to register. Courses in cytology and in taxonomic botany or zoology will be found helpful. Lectures, M T W Th F, 8. Laboratory, M W F, 1:40-4. Conferences to be arranged. *Plant Science* 146. Assistant Professor FRASER.

A general introductory course designed to acquaint the student with the fundamental principles of heredity and variation. Special attention is given to the Mendelian interpretation of the facts of inheritance. Among the topics to be discussed are: the physical basis of heredity; determination of sex; factor linkage; measurement of variation; quantitative inheritance; pure lines; inbreeding and

cross-breeding; cytoplasmic inheritance; and mutation; with suggestions as to the relation of genetical principles to eugenics. Laboratory studies of variation and of the laws of heredity as illustrated by hybrid material in plants and by breeding experiments with the fruit fly, *Drosophila*. Laboratory fee, \$3.

[S 6. **Cytology**. Not given in 1934.]

[**General Bacteriology**. Professor SHERMAN and Assistant Professor STARK. Given in Summer School of Agriculture.]

## METHODS

Arrangements can be made, contingent upon the time of the instructor, for additional instruction in biological technique. This may include instruction in methods of collecting and preparing laboratory and museum material, the technique of hybridization, etc.

## RESEARCH

In addition to the professors named as directly connected with the Summer School of Biology, other professors who may be in residence during the summer will supervise graduate students engaged in research; Professors Barrus, Blodgett, Burkholder, Chupp, Fernow, Guterman, Hildebrand, Mills, Newhall, Reddick and Whetzel in Plant Pathology; Professors Needham, Bradley, and Herrick in Entomology; Professor Claassen in Biology; Professor Allen in Ornithology; and Professors Bussell, Emerson, Livermore, Myers and Wiggans in Plant Breeding and Genetics

## OTHER COURSES

Besides the courses here included in the Summer School of Biology, the following courses dealing with plants and animals are given in the summer, and may be found described in the Announcement of the Summer Session, a copy of which will be sent on request.

**General Biology I.** Credit three hours. Professor CLAASSEN

**Laboratory and Field Biology.** Credit two hours. Professor CLAASSEN.

**Ornithology.** Credit three hours. Professor ALLEN.

**Trees and Shrubs.** Credit two hours. Assistant Professor MUENSCHER.

**Woody Plant Materials for Landscape Planting.** Credit four hours. Professor R. W. CURTIS.

**Woody Plant Propagation and Nursery Work.** Credit one hour. Assistant Professor HUNN.

**Summer Propagation of Woody Plants.** Credit two hours. Assistant Professor HUNN.

**Landscape Planting.** Credit two hours. Assistant Professor PORTER.

**Garden Flowers.** Credit two hours. Assistant Professor MINNS.

**Indoor Flower Growing.** Credit one hour. Assistant Professor MINNS.

**General Bacteriology.** Credit two or four hours. Professor SHERMAN and Assistant Professor STARK.

**Teaching of Nature Study and Elementary Science.** Credit two hours. Professor PALMER.

**Teaching of Science in Rural Secondary Schools.** Credit two hours. Professor PALMER.

**Diseases of Plants and their Control.** Credit one to four hours. Assistant Professor WELCH.

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*Announcement of the Summer School of Biology.*

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